

ASAS Centennial Paper: Future research in physiology and endocrinology

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Abstract :

Over the next quarter century in North America, the following eventualities are likely for physiology and endocrinology research with agricultural animals. 1) Total funding adjusted for inflation will change little but will come less from public sources, and most of that will be in the context of human health. Much of the privately funded research will be herd specific and remain proprietary. 2) The numbers of MS, PhD, and postdoctoral students probably will decrease, but research in the context of credentialing will remain important. 3) Resources such as expanded databases in genomics and proteomics, and remarkable new tools such as small inhibitory RNA will continue to become available, likely at a faster rate than in the previous 25 yr. 4) The huge amount of data from production agriculture will make agricultural animals ideal models for some kinds of basic research, such as studying fetal programming, resulting in synergy with more applied research. Most of these experimental animals will be in private production herds and flocks, even when work is publicly funded. 5) The trend toward more interdisciplinary research will continue, especially considering interactions among reproduction, health, nutrition, selective breeding, management factors, and societal concerns; reductionist research probing deeper into cellular and molecular mechanisms will remain important, as will whole-animal approaches. 6) Agricultural animals are a product of evolution plus selective breeding. Insights drawn from the former will aid progress in the latter. One focus of research in physiology and endocrinology will be understanding heterosis, inbreeding depression, and epigenetic effects as it becomes possible to manipulate and identify the allelic structure of individual animals. 7) Additional insightful concepts will evolve that will simplify thinking in some respects, such as the maternal to embryonic shift in transcribed RNA in early embryos; however, animal biology will turn out to be even more complex than most of us currently imagine.

Key Word :

centennial, endocrinology, future, physiology, research

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